Department of Energy
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221

ENTERED

AUG 2011

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Mr. John Kieling, Acting Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Review of Idaho National Laboratory - Central Characterization Project Waste Stream Profile Form Number, ID-SNL-HCF-S5400

Dear Mr. Kieling:

The Carlsbad Field Office has approved the Waste Stream Profile Form (WSPF) Number, ID-SNL-HCF-S5400, *SNL/NM Hot Cell Facility Contact-Handled Transuranic Waste (Debris)*, for the Central Characterization Project at Idaho National Laboratory.

Enclosed is a copy of the WSPF as required by Section C-5a of the Waste Isolation Pilot Plant, Hazardous Waste Facility Permit No. NM4890139088-TSDF.

If you have any questions, please call the Director of the Office of the National TRU Program, Mr. J. R. Stroble, at (575) 234-7313.

Sincerely,

Edward Ziemianski
Interim Manager

Enclosure

cc: w/enclosure
T. Hall, NMED *ED
J. Davis, NMED ED
S. Holmes, NMED ED

cc: w/o enclosure
J. R. Stroble, CBFO ED
N. Castaneda, CBFO ED
B. Mackie, CBFO ED
T. Morgan, CBFO ED
CBFO M&RC
*ED denotes electronic distribution

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CBFO:NTP:JRS:GS:11-1733:UFC 5900.00

Attachment 2 – CCP Waste Stream Profile Form

(1) Waste Stream Profile Number: ID-SNL-HCF-S5400						
(2) Generator site name: Idaho National Laboratory					(4)Technical contact: Jim Vernon	
(3) Generator site EPA ID: ID4890008952					(6) Technical contact phone number: 575-234-7141	
(5) Date of audit report approval by New Mexico Environment Department (NMED): September 19, 2005, June 29, 2006; August 6, 2007, September 22, 2008, September 11, 2009, October 20, 2010						
(7) Title, version number, and date of documents used for WAP Certification: CCP-PO-001, CCP Transuranic Waste Characterization Quality Assurance Project Plan, Revision 20, June 16, 2011; CCP-PO-002, CCP Transuranic Waste Certification Plan, Revision 26, July 14, 2011; CCP-PO-024, CCP/INL Interface Document, Revision 11 July 18, 2011; CCP-AK-INL-021 Central Characterization Project Acceptable Knowledge Summary Report for Idaho National Laboratory Sandia National Laboratories/New Mexico Hot Cell Facility Contact Handled Transuranic Waste (Debris) Waste Stream: ID-SNL-HCF-S5400 Revision 2, August 25, 2011						
(8) Did your facility generate this waste?	YES		NO	X		
(9) If no, provide the name and EPA ID of the original generator: Sandia National Laboratories/New Mexico, NM5890110518						
Waste Stream Information						
(10) WIPP ID: SA-W134[2]					(11) Summary Category Group: S5000	
(12) Waste Matrix Code Group: Heterogeneous Debris Waste					(13) Waste Stream Name: SNL/NM Hot Cell Facility Contact Handled Transuranic Waste (Debris)	
(14) Description from the TWBIR: Heterogeneous CH Debris from SNL/NM Hot Cell Facility D&D project and other miscellaneous waste generators.						
(15) Defense TRU Waste:	YES	X	NO			
(16) Check One:	CH	X	RH			
(17) Number of SWBs NA		(18) Number of Drums[3] 3 55-gallon drums			(19) Number of Canisters NA	
(20) Batch Data Report numbers supporting this waste stream characterization: See Characterization Information Summary (CIS) Correlation of Container Identification Numbers to Batch Data Report Numbers.						
(21) List applicable EPA Hazardous Waste Numbers:[1] D004, D005, D006, D007, D008, D009, D011, D019, D022, D028, F002 and F005						
(22) Applicable TRUCON Content Numbers: SQ125/225						
(23)**Acceptable Knowledge Information**						
(For the following, enter the supporting documentation used [i.e., references and dates])						
Required Program Information						
(23A) Map of site: CCP-AK-INL-021, Revision 2, August 25, 2011, Figures 1, 2, 3 and 5						
(23B) Facility mission description: CCP-AK-INL-021, Revision 2, August 25, 2011, Section 4.2						
(23C) Description of operations that generate waste: CCP-AK-INL-021, Revision 2, August 25, 2011, Section 4.4						
(23D) Waste identification/categorization schemes: CCP-AK-INL-021, Revision 2, August 25, 2011, Section 4.5.2						
(23E) Types and quantities of waste generated: CCP-AK-INL-021, Revision 2, August 25, 2011, Section 4.5.1						
(23F) Correlation of waste streams generated from the same building and process, as applicable: CCP-AK-INL-021, Revision 2, August 25, 2011, Section 4.5.3						
(24) Waste certification procedures: CCP-TP-030, Revision 29, April 26, 2011						

(25)Required Waste Stream Information:			
(25A) Area(s) and building(s) from which the waste stream was generated: CCP-AK-INL-021, Revision 2, August 25, 2011, Section 5.1			
(25B) Waste stream volume and time period of generation: CCP-AK-INL-021, Revision 2, August 25, 2011, Section 5.2			
(25C) Waste generating process description for each building: CCP-AK-INL-021, Revision 2, August 25, 2011, Section 5.3			
(25D) Waste Process flow diagrams: NA			
(25E) Material inputs or other information identifying chemical/radionuclide content and physical waste form: CCP-AK-INL-021, Revision 2, August 25, 2011, Section 5.4			
(25F) Waste Material Parameter Weight Estimates per unit of waste: See Table entitled "Waste Stream ID-SNL-HCF-S5400 Waste Material Parameters" in the Summation of Aspects of AK Summary report: ID-SNL-HCF-S5400			
(26) Which Defense Activity generated the waste: (check one)			
	Weapons activities including defense inertial confinement fusion		Naval Reactors development
	Verification and control technology	X	Defense research and development
	Defense nuclear waste and material by products management		Defense nuclear material production
	Defense nuclear waste and materials security and safeguards and security investigations		
(27)Supplemental Documentation			
(27A) Process design documents: See C1013, C014, C1016, C1017, C1025, I1002, P1003, P1004, P1044 and U1004 in Summation of Aspects of AK Summary Report: Waste Stream ID-SNL-HCF-S5400, Source Documents			
(27B) Standard operating procedures: See C1040, C1041, I1002, I1024, I1028, I1031, I1033, I1034, I1035, I1036, I1039, I1040, I1041, I1045, I1046, I1047, I1048, I1049, I1050, I1051, I1052, M1012, M1014, M1020, P1101, U1009, U1012, U1025, U1026, U1027 and U1028 in Summation of Aspects of AK Summary Report: Waste Stream ID-SNL-HCF-S5400, Source Documents			
(27C) Safety Analysis Reports: See I1013, I1037, I1038, I1039, M1014, P1013, P1104 and U1012 in Summation of Aspects of AK Summary Report: Waste Stream ID-SNL-HCF-S5400, Source Documents			
(27D) Waste packaging logs: C1020, C1028, C1029, C1033, C1034, C1035, M1013, M1016, M1019 and M1020 in Summation of Aspects of AK Summary Report: Waste Stream ID-SNL-HCF-S5400, Source Documents			
(27E) Test plans/research project reports: See C1012, C1026, C1031, C1032, I1002, I1004, I1005, I1006, I1007, I1009, I1010, I1012, I1020, I1021, I1022, I1028, I1031, I1032, M1014, P1001, P1002, P1004, P1005, P1006, P1007, P1008, P1009, P010, P1011, P1012, P014, P1016, P1018, P1019, P1020, P1021, P1022, P1025, P1026, P1027, P1028, P1031, P1032, P1033, P1034, P1035, P1036, P1037, P1038, P1039, P1040, P1043, P1045, P1046, P1047, P1048, P1049, P1050, P1051, U1001, U1002, U1009, U1010, U1011, U1012, U1014, U1022, U1026 and U1027 in Summation of Aspects of AK Summary Report: Waste Stream ID-SNL-HCF-S5400, Source Documents			
(27F) Site databases: See C1005 and M1019 in Summation of Aspects of AK Summary Report: Waste Stream ID-SNL-HCF-S5400, Source Documents			
(27G) Information from site personnel: See C1026 and C1037 in Summation of Aspects of AK Summary Report: Waste Stream ID-SNL-HCF-S5400, Source Documents			
(27H) Standard industry documents: See I1023, I1030, M1014, P1025 and U1012 in Summation of Aspects of AK Summary Report: Waste Stream ID-SNL-HCF-S5400, Source Documents			
(27I) Previous analytical data: See C1021, C1022, C1023, C1024, C1027, C1030, C1033, C1034, C1035, DR1001, DR1003, I1001, I1025, M1010, M1011, M1013, M1015, M1016, M1020, M1021 and U1021 in Summation of Aspects of AK Summary Report: Waste Stream ID-SNL-HCF-S5400, Source Documents			
(27J) Material safety data sheets: See I1030, M1007 and P1102 in Summation of Aspects of AK Summary Report: Waste Stream ID-SNL-HCF-S5400, Source Documents			

(27J) Material safety data sheets: See I1030, M1007 and P1102 in Summation of Aspects of AK Summary Report: CCP-AK-INL-021, Revision 2, August 25, Source Documents	
(27K) Sampling and analysis data from comparable/surrogate Waste: NA	
(27L) Laboratory notebooks: See I1006, I1007 and I1014 in Summation of Aspects of AK Summary Report: CCP-AK-INL-021, Revision 2, August 25, Source Documents	
Confirmation Information[2]	
For the following, when applicable, enter procedure title(s), number(s) and date(s)	
(28)	Radiography: CCP-TP-053, Revision 11, July 20, 2011
(29)	Visual Examination: NA
(30) Comments: For a list of the waste characterization procedures used and date of respective procedures see the list of procedures on the attached CIS.	

Reviewed by AK Expert: YES [X] Date: 8/02/2011

Reviewed by STR (if necessary): YES [X] N/A [ ] Date: 8/02/2011

Waste Stream Profile Form Certification:

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

(31)	(32) Jim Vernon	(33) 8-25-2011
Signature of Site Project Manager	Printed Name	Date

NOTE: (1) If, radiography, visual examination were used to confirm EPA Hazardous Waste Numbers, attach signed Characterization Information Summary documenting this determination.
(2) SA-W134M is also identified in the ATWIR and applies to this waste stream.
(3) There are only 3 55-gallon drums in this waste stream. All 3 drums were head-space gas sampled.

CHARACTERIZATION INFORMATION SUMMARY

WSPF # ID-SNL-HCF-S5400

Lot 1

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CCP Characterization Information Summary Cover Page

Waste Stream #	ID-SNL-HCF-S5400	Lot #:	1
AK Expert Review:	N/A	Date:	N/A
SPM Review:	Jim Vernon	Date:	8/15/2011

SPM signature certifies that through Acceptable Knowledge testing and/or analysis that the waste identified in this summary is not corrosive, ignitable, reactive, or incompatible with the TSDF.

A summary of the Acceptable Knowledge regarding this waste stream containing specific information about the corrosivity, reactivity, and ignitability of the waste stream is included as an attachment to the Waste Stream Profile Form. By reference, that information is included in this lot.

List of procedures used:

Real-Time Radiography (RTR):

CCP-TP-053	Rev. 11	07/20/11	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 10	03/04/11	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 9	09/30/10	CCP Standard Real-Time Radiography (RTR) Inspection Procedure

Non Destructive Assay (NDA):

CCP-TP-109	Rev. 8	08/10/11	CCP Data Reviewing, Validating, and Reporting Procedure
CCP-TP-109	Rev. 7	01/26/11	CCP Data Reviewing, Validating, and Reporting Procedure
CCP-TP-019	Rev. 5	09/16/09	CCP Waste Assay Gamma Spectrometer (WAGS) Operating Procedure
CCP-TP-115	Rev. 4	06/24/09	CCP SWEPP Gamma-Ray Spectrometer (SGRS) Operating Procedure

Headspace Gas Analysis:

CCP-TP-093	Rev. 15	03/10/11	CCP Sampling of TRU Waste Containers
CCP-TP-093	Rev. 14	12/29/10	CCP Sampling of TRU Waste Containers
CCP-TP-173	Rev. 1	09/30/09	CCP Analysis of Gas Samples for VOCs by GC/FID
CCP-TP-175	Rev. 3	08/02/11	CCP Analysis of Gas Samples for VOCs by GC/MS
CCP-TP-175	Rev. 2	12/29/10	CCP Analysis of Gas Samples for VOCs by GC/MS

Project Level Data Validation / DQO Reconciliation:

CCP-TP-001	Rev. 19	12/29/10	CCP Project Level Data Validation and Verification
CCP-TP-002	Rev. 23	12/29/10	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-003	Rev. 18	12/29/10	CCP Data Analysis for S3000, S4000, and S5000 Characterization
CCP-TP-005	Rev. 23	06/30/11	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 22	04/21/11	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 21	12/29/10	CCP Acceptable Knowledge Documentation
CCP-TP-030	Rev. 29	04/26/11	CCP CH TRU Waste Certification and WWIS/WDS Data Entry

WAP Certification:

CCP-PO-001	Rev. 20	06/16/11	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-001	Rev. 19	12/29/10	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-002	Rev. 26	07/14/11	CCP Transuranic Waste Certification Plan
CCP-PO-002	Rev. 25	12/29/10	CCP Transuranic Waste Certification Plan

CCP Correlation of Container Identification Numbers to Batch Data Report Numbers

Waste Stream: # ID-SNL-HCF-S5400 Lot # 1

Container ID Number	NDA BDR	RTR BDR	VE BDR	Solids Sampling BDR	Solids Analytical BDR	Load Management/ Overpack Yes	Headspace Gas BDR				GGT BDR
							Sample	Analysis			
SNL/NM006035	INNDAW110042	INRTR5110022	N/A	N/A	N/A	N/A	INHSG1101	ECL11005G	ECL11005M	N/A	N/A
SNL/NM006418	INNDAW110042	INRTR5110022	N/A	N/A	N/A	N/A	INHSG1101	ECL11005G	ECL11005M	N/A	N/A
SNL/NM006419R	INNDAS110080	INRTR5110056	N/A	N/A	N/A	N/A	INHSG1105	ECL11018G	ECL11018G	N/A	N/A

Signature of Site Project Manager

Jim Vernon
Printed Name

8/15/2011
Date

CCS-003

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: ID-SNL-HCF-S5400 **Waste Stream Lot Number** 1 through 1

ANALYTE	Transform Data Used (No, Data-Log, SQRT, other)	# Samples above MDL [1]	# Samples	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	Transformed PRQL (N/A or Value)	UCL_{90} > PRQL Yes	EPA Code
Acetone	No	2	3	5.9000	3.0072	2.9403	6.2082	100	N/A		
Benzene	No	0	3	0.0275	0.0240	0.0052	0.0297	10	N/A		
Bromoform	No	0	3	0.0080	0.0073	0.0012	0.0086	10	N/A		
Butanol	Log	1	3	0.1823	-2.1869	2.0681	0.0646	100	4.6052		
Carbon Disulfide [a]	No	2	3	0.0910	0.0573	0.0381	0.0988	10	N/A		
Carbon Tetrachloride	Log	3	3	-1.6607	-2.8595	1.0393	-1.7281	10	2.3026		
Chlorobenzene	No	0	3	0.0190	0.0172	0.0028	0.0202	10	N/A		
Chloroform	No	0	3	0.0255	0.0235	0.0026	0.0264	10	N/A		
Chloromethane [a]	Log	0	3	-3.4112	-3.5091	0.0865	-3.4149	10	2.3026		
Cyclohexane [a]	No	0	3	0.0315	0.0288	0.0038	0.0330	10	N/A		
1,1-Dichloroethane	Log	0	3	-3.1466	-3.8162	0.5802	-3.1846	10	2.3026		
1,2-Dichloroethane	Log	1	3	-0.4943	-2.5882	1.8158	-0.6114	10	2.3026		
1,1-Dichloroethylene	No	0	3	0.0160	0.0157	0.0003	0.0160	10	N/A		
cis-1,2-Dichloroethylene [a]	No	0	3	0.0320	0.0268	0.0081	0.0356	10	N/A		
trans-1,2-Dichloroethylene	No	0	3	0.0280	0.0248	0.0046	0.0299	10	N/A		
1,2-Dichloropropane [a]	Log	0	3	-3.8397	-3.9135	0.0652	-3.8425	10	2.3026		
Ethyl benzene	Log	0	3	-4.0456	-4.0950	0.0455	-4.0455	10	2.3026		
Ethyl Ether	No	0	3	0.0400	0.0248	0.0131	0.0391	100	N/A		
Methanol	No	0	3	15.0000	14.6667	0.2887	14.9809	100	N/A		
Methyl Ethyl Ketone	No	2	3	1.5000	0.7322	0.7302	1.5271	100	N/A		
Methyl Isobutyl Ketone	Log	1	3	-2.3026	-3.2022	0.8297	-2.2990	100	4.6052		
Methylene Chloride	No	0	3	0.0315	0.0268	0.0072	0.0347	10	N/A		
1,1,2,2-Tetrachloroethane	No	0	3	0.0120	0.0117	0.0003	0.0120	10	N/A		
Tetrachloroethylene	No	0	3	0.0175	0.0157	0.0028	0.0187	10	N/A		
Toluene	SQRT	3	3	1.0488	0.6724	0.3910	1.0980	10	3.1623		
1,1,1-Trichloroethane	Log	2	3	-2.7646	-3.5484	0.7706	-2.7095	10	2.3026		
Trichoroethylene	Log	1	3	-2.4889	-3.5970	0.9598	-2.5521	10	2.3026		
1,1,2-Trichloro-1,2,2-trifluoroethane	Log	1	3	-3.8167	-4.1302	0.2721	-3.8340	10	2.3026		

CBS - 004

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: ID-SNL-HCF-S5400 **Waste Stream Lot Number** 1 through 1

ANALYTE	Transform Data Used (No, Data-Log, SQRT, other)	# Samples above MDL (1)	# Samples	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	Transformed PRQL (N/A or Value)	UCL_{90} > PRQL Yes	EPA Code
1,3,5-Trimethylbenzene [a]	No	0	3	0.0170	0.0165	0.0005	0.0170	10	N/A		
1,2,4-Trimethylbenzene [a]	No	0	3	0.0210	0.0188	0.0033	0.0225	10	N/A		
m/p-Xylene [b]	Log	1	3	-2.8134	-3.5264	0.6670	-2.8002	10	2.3026		
p-Xylene	Log	1	3	-2.8134	-3.5264	0.6670	-2.8002	10	2.3026		
o-Xylene	No	0	3	0.0290	0.0248	0.0064	0.0318	10	N/A		

[a] These compounds are from the CH-TRAMPAC or CH-TRUCON and are flammable VOCs that do not appear in the QAPjP or the WIPP WAP. These are not part of the target analyte list, but samples may be analyzed for these compounds.

[b] These xylene isomers cannot be resolved by the analytical methods employed in the program. m-Xylene and p-Xylene will be reported as "Total m-p-Xylene."

Comments:

(1) For analytes where there were no samples measured above the MDL value, 1/2 of the MDL value was used. (Per section C4 of the WAP, 1/2 of the MDL value is used in calculating the mean concentration.)

Signature of Site Project Manager

Jim Vernon
Printed Name

8/15/2011
Date

CBS-005

CCP Headspace Gas Summary Data

Waste Stream Number ID-SNL-HCF-S5400 Lot Number (s) 1 through 1

Tentatively Identified Compound	Maximum Observed Estimated Concentrations (ppmv)	# Samples Containing TIC	% Detected
NONE	N/A	N/A	N/A

Data Supports EPA Hazardous Waste Numbers Assigned by AK? Yes ☑ No ☐

If no, describe the basis for assigning the EPA Hazardous Waste Codes:

SPM Signature _____ Date 8/15/2011

CFS-006

CCP RTR/VE Summary of Prohibited Items and AK Confirmation

Waste Stream Number: ID-SNL-HCF-S5400 Lot #: 1

Container Number	RTR Prohibited Items [a,b]	Visual Examination Prohibited Items [a,b]
See correlation of container ID numbers for list of remaining drum numbers in this Lot.	None of the containers in this lot had prohibited items identified during RTR.	VE was not used to certify any containers in this Lot.

a. See Batch Data Reports

b. If AK has assigned U134 to this waste stream, then any liquids in these containers are prohibited items (not acceptable by the TSDF).

Justification for the selection of RTR and/or VE: RTR was selected as the characterization method for this lot because the waste containers were previously packaged and RTR is an acceptable characterization method to meet all the Data Quality Objectives for NDE of waste stream ID-SNL-HCF-S5400.

Site Project Manager Signature | Jim Vernon Printed Name | 8/15/2011 Date

CFS-007

CCP Reconciliation with Data Quality Objectives

WSPF# ID-SNL-HCF-S5400 Lot # 1

Sampling Completeness

RTR/VE

Number of Valid Samples: 3 Number of Total Samples Analyzed: 3
Percent Complete: 100 (QAO is 100%)

NDA

Number of Valid Samples: 3 Number of Total Samples Analyzed: 3
Percent Complete: 100 (QAO is 100%)

HSG

Number of Valid Samples: 3 Number of Total Samples Collected: 3
Percent Complete: 100 (QAO is ≥90%)
Number of Valid Samples: 3 Number of Total Samples Analyzed: 3
Percent Complete: 100 (QAO is ≥90%)

Total VOC

Number of Valid Samples: NA Number of Total Samples Collected: NA
Percent Complete: NA (QAO is ≥90%)
Number of Valid Samples: NA Number of Total Samples Analyzed: NA
Percent Complete: NA (QAO is ≥90%)

Total SVOC

Number of Valid Samples: NA Number of Total Samples Collected: NA
Percent Complete: NA (QAO is ≥90%)
Number of Valid Samples: NA Number of Total Samples Analyzed: NA
Percent Complete: NA (QAO is ≥90%)

Total Metals

Number of Valid Samples: NA Number of Total Samples Collected: NA
Percent Complete: NA (QAO is ≥90%)
Number of Valid Samples: NA Number of Total Samples Analyzed: NA
Percent Complete: NA (QAO is ≥90%)

CDS-008

CCP Reconciliation with Data Quality Objectives

WSPF# ID-SNL-HCF-S5400 Lot # 1

	Y/N/NA	Reconciliation Parameter
1	Y	Waste Matrix Code.
2	Y	Waste Material Parameter Weights.
3	Y	The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.
4	Y	The TRU activity reported in the BDRs for each container demonstrates with a 95% probability that the container of waste contains TRU radioactive waste.
5	N	AK Sufficiency. Is there an approved AK sufficiency Determination for this waste stream?
6	Y	Mean concentrations, UCL_{90} values for the mean concentration, standard deviations, and the number of samples collected for each VOC in the HSG of each container were calculated and compared with the program required quantitation limits, as reported in CCP-TP-003 Attachment 3, and additional U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers were assigned as required. Samples were randomly collected (when appropriate).
7a	NA	Mean concentrations, UCL_{90} values for the mean concentration, standard deviations, and the number of samples collected for solids VOCs were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003 Attachment 4, and additional EPA HWNs were assigned as required. Samples were randomly collected.
7b	NA	Mean concentrations, (UCL_{90}) values for the mean concentration, standard deviations, and the number of samples collected for solids SVOCs were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003 Attachment 5, and additional EPA HWNs were assigned as required. Samples were randomly collected.
7c	NA	Mean concentrations, (UCL_{90}) values for the mean concentration, standard deviations, and the number of samples collected for total metals were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003 Attachment 6, and additional EPA HWNs were assigned as required. Samples were randomly collected.

CCP Reconciliation with Data Quality Objectives

WSPF# ID-SNL-HCF-S5400 Lot # 1

8	Y	The data demonstrates whether the waste stream exhibits a toxicity characteristic under Title 40 Code of Federal Regulations (CFR), Part 261, Identification and Listing of Hazardous Waste, Subpart C, Characteristics of Hazardous Waste.
9	Y	Does the waste stream contain listed waste found in 20.4.1.200 NMAC incorporating 40 CFR Part 261, Subpart D, Lists of Hazardous Wastes.
10	Y	Waste stream can be classified as hazardous or nonhazardous at the 90-percent confidence level.
11	Y	Appropriate packaging configuration and Drum Age Criteria (DAC) is applied and documented in the headspace gas sampling documentation, and the drum age met prior to sampling.
12	Y	TICs were appropriately identified and reported in accordance with the requirements of Section C3-1 of the QAPjP.
13	Y	The PRQLs for headspace gas VOCs were met for all analyses as evidenced by the analytical batch data reports.
14		The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WAP Sections C3-2 through C3-9 prior to submittal of a waste stream profile form for a waste steam or waste stream lot.

	Completeness	Comparability	Representativeness
Radiography	Y	Y	Y
VE	NA	NA	NA
Headspace Gas Analysis	Y	Y	Y
Solids Sampling	NA	NA	NA
Solids VOCs	NA	NA	NA
Solids SVOCs	NA	NA	NA
Solids Metals	NA	NA	NA

Comments:

None

Signature of Site Project Manager	Jim Vernon	8/15/2011
	Printed Name	Date

CES-010

SUMMATION OF ASPECTS OF AK SUMMARY REPORT: WASTE STREAM ID-SNL-HCF-S5400

Overview:

Waste stream ID-SNL-HCF-S5400 is mixed heterogeneous debris originally packaged during Sandia National Laboratories/New Mexico (SNL/NM) Hot Cell Facility (HCF) decontamination activities conducted from 1995 to 1997. This waste stream consists of organic and inorganic debris generated during the destructive and nondestructive examinations conducted in the HCF, and includes personal protective equipment (PPE) and plastic from decontamination and repackaging activities. Additional containers may be added to this waste stream as a result of the repackaging of the corresponding remote-handled (RH) population. The waste has been shipped to the Radioactive Waste Management Complex (RWMC) Transuranic Storage Area (TSA) located at the Idaho National Laboratory (INL). The waste will be characterized by the Central Characterization Project (CCP) at RWMC Advanced Mixed Waste Treatment Project (AMWTP) prior to shipment to the Waste Isolation Pilot Plant (WIPP).

WIPP requires generator sites to determine that Transuranic (TRU) waste streams to be disposed of at WIPP meet the definition of TRU defense waste. TRU waste is eligible for disposal at WIPP if it has been generated in whole or part by one of the atomic energy defense activities listed in Section 10101(3) of 42 U.S.C 10101, *Nuclear Waste Policy Act of 1982* (NWPA). Based on the review of Acceptable Knowledge (AK) there is sufficient evidence to demonstrate that TRU wastes generated by the HCF operations are contaminated with materials from atomic energy defense research activities associated primarily with projects conducted to support safety programs for reactors with defense missions.

The United States has historically operated and continues to operate reactors used for the development of nuclear energy technology. Additionally, these reactors have been utilized to produce radioisotopes for medical, industrial, and military purposes; to generate neutron environments for scientific research; and to conduct irradiation experiments in support of the government's defense, space, fusion, and advanced reactor programs. Collectively referred to as test and research reactors, these facilities have been typically operated by private contractors for the Department Of Energy (DOE). Mixed oxide, carbide, and alloy fuels for, or tests in, the DOE breeder reactor research and testing program were manufactured with plutonium obtained primarily from DOE production reactors at the Hanford and Savannah River Site (SRS) sites. DOE test and research reactor facilities include the Argonne National Laboratory – West (ANL-W) Experimental Breeder Reactor-II (EBR-II) and Hanford Fast Flux Test Facility (FFTF) reactors.

In 1967 the U.S. Atomic Energy Commission (AEC) initiated the Liquid Metal Fast Breeder Reactor (LMFBR) Program for developing and demonstrating fast breeder reactor technology for safe, reliable, and economical energy production. Critical to this demonstration program was the design, development, and construction or modification of facilities capable of manufacturing, testing, and examining these reactor materials. The ANL-W EBR-II and Hanford FFTF reactors were the most

important facilities in the LMFBR Program. The FFTF was constructed to produce higher neutron flux and testing capabilities than produced by EBR-II. Even though the primary mission of the DOE test and research reactors was focused on the development of commercial energy technology, the reactors had an underlying defense mission and ongoing defense research and development experiments were conducted in these facilities. The HCF supported the development of the LMFBR technology by conducting experiments to simulate core disruptive accident conditions utilizing irradiated EBR-II mixed oxide reactor.

EBR-II supported ongoing defense experiments conducted throughout the 30-year operating life of the reactor (1964-1994). In 1968-1969, the reactor was converted to a fast-reactor irradiation test facility. Test fuels and materials were placed in the core assemblies identical to those holding the driver fuel assemblies. In addition to supporting the LMFBR Program, numerous experiments were conducted for defense applications, including support of the Bettis Atomic Power Laboratory dedicated to supporting the Naval Nuclear Propulsion Program. Other defense program experiments conducted at EBR-II included radiation of thermionic elements and tritium production test materials. During its final year, experiments included a cooperative effort between Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL) to demonstrate disposition of weapons plutonium in a fast reactor.

The EBR-II and FFTF reactors also supported the irradiation of experimental fuel pins manufactured at the LANL as part of the SP-100 Fuel Pin Irradiation Testing program during the late 1980s and early 1990s. This program, initiated in 1983, was jointly funded by National Aeronautics and Space Administration (NASA), DOE, and the Strategic Defense Initiative Organization (SDIO). The SDIO (better known as the "Star Wars" program) was established to pursue technology in the development of a viable and comprehensive ballistic missile defense program. The SP-100 program's objective was to verify and validate the design of a compact, fast-spectrum nuclear reactor fuel for a broad range of national defense-related space applications. SNL/NM was involved in the development of SDIO technology associated with the Fission Activated Laser Concept (FALCON) project conducted in Building 6580. This program involved the development of a high-power, steady state, nuclear reactor-pumped laser concept being developed for the DOE Defense Program.

SNL/NM involvement with the New Production Reactor (NPR) program tests were in support of research relating to the production of tritium for weapons production. Historically tritium was produced at the K Reactor and other reactors at the Savannah River Site (SRS). As the reactors were shut down, tritium production declined and halted altogether in 1988 when the K Reactor was shut down for safety upgrades. In the same year, DOE initiated the NPR project to develop a long term source of tritium to replace the aging K Reactor.

Many of the HCF experiments were irradiated in the Annular Core Research Reactor (ACRR). The ACRR is a pool type research reactor capable of pulsed operation, steady-state operation, and a tailored transient rod withdrawal operation. The reactor was designed to produce a high yield of high-energy neutrons in the central irradiation dry cavity and other experimental facilities over a very short time-

range pulse. This reactor supported DOE and U.S. Department of Defense (DOD) defense experiments, including the irradiation of components for defense programs and tritium production research.

Based on a review of the waste management practices in the HCF, commingling of the material from the defense related projects described above would have occurred. In addition to cross contamination introduced during the storage of test materials in common storage areas in the HCF, waste materials from ongoing process operations remained in the work areas and were repackaged and moved between areas during decontamination campaigns. Waste materials from the programs were combined during repackaging, contamination from cutting, grinding, and polishing activities and would also remain in the area contaminating surfaces and equipment. This contamination would remain in the area to commingle with wastes generated during subsequent examinations. Additionally, project tooling, equipment, and instruments were shared between projects resulting in further cross-contamination. As a result of the waste management practices and destructive analytical nature of the operations conducted in the HCF, segregation of cross-contaminated non-defense waste from defense-related waste is not feasible. Based on a review of the AK record, there was no generator documentation indicating the intentional segregation of materials originating from defense experiments from non-defense experiments. Therefore, waste stream ID-SNL-HCF-S5400 is eligible for disposal at WIPP as a commingled defense waste stream generated "in part" by the atomic energy defense activities described in this section.

This Summation of Aspects supports Waste Stream Profile Form (WSPF) number ID-SNL-HCF-S5400 and is based on CCP-AK-INL-021, *Central Characterization Project Acceptable Knowledge Summary Report For Idaho National Laboratory, Sandia National Laboratories/New Mexico Hot Cell Facility Contact Handled Transuranic Waste (Debris), Waste Stream: ID-SNL-HCF-S5400*, Revision 2, August 25, 2011.

Waste Stream Identification Summary:

Waste Stream Name:	SNL/NM Hot Cell Facility Contact Handled Transuranic Waste (Debris)
Waste Stream Number:	ID-SNL-HCF-S5400
Waste Stream Volume, Current:	3 55-gallon drums
Waste Stream Volume, Projected:	0[1]
Generation Dates (Original HCF decontamination packaging)	1995 - 1997
Summary Category Group:	S5000
Waste Matrix Code Group:	Heterogeneous Debris Waste

Waste Matrix Code: S5400

TRUPACT-II Content Code (TRUCON): SQ125, SQ225

Annual Transuranic Waste Inventory Report (ATWIR)
Identification Number: SA-W134[2]

[1]No further generation of TRU waste from SNL/NM Hot Cell Facility is expected; however, there are additional drums at SNL/NM that have already been generated that may ship to INL to become part of this waste stream.

[2] SA-W134M is also identified in the ATWIR and applies to this waste stream.

Waste Stream Description and Physical Form

The Waste Isolation Pilot Plant Waste Analysis Plan (WIPPWAP) defines a waste stream as waste materials that have common physical form, that contain similar hazardous constituents, and that are generated from a single process or activity. Based on a review of the AK record and SNL/NM waste management practices, TRU debris waste from HCF decontamination operations was delineated based on the WIPP-WAP waste stream definition.

The basis and rationale for delineating this waste stream is as follows:

- Waste stream SNL-HCF-S5400 was generated by HCF research operations associated with pre- and post-irradiation examination experiments and the associated decontamination waste from the areas performing these experiments.

- Based on the review of the container documentation, the waste materials in waste stream ID-SNL-HCF-S5400 consist predominantly of organic and inorganic debris materials and may contain lesser amounts of homogeneous solids (e.g., vermiculite, Quik Solid, and Aquaset). Though the composition (e.g., cellulosics, plastic, metal) of the individual debris waste items varies between containers the materials are similar in physical form as delineated in this report.

- Waste stream ID-SNL-HCF-S5400 consists of containers from the CH population of the TRU waste inventory generated during the HCF decontamination process.

- Nuclear material storage, historic process operations, waste management, decontamination operations and subsequent waste management and repackaging operations would have resulted in the TRU waste materials to be contaminated with similar radiological and chemical constituents. Based on review of the AK record the following resulted in comingling of chemical and radiological contamination in the TRU waste materials:

- Storage and frequent movement of the nuclear test materials in common HCF storage areas;

- Transfer of materials, specimens, equipment, and waste between research areas;

- Contamination from previous destructive experiments on research area surfaces and from waste from previous experiments stored in the area;

- Historic sharing of equipment between areas;

- Fume hood operations involving the preparation of experimental chemicals and the decontamination of equipment for HCF areas;

- RH waste parcels identified during CH repackaging operations conducted in the Radioactive and Mixed Waste Management Facility (RMWMF) were comingled.

Based on the rational above, waste stream ID-SNL-HCF-S5400 meets the WIPP-WAP waste stream definition.

Waste stream ID-SNL-HCF-S5400 consists of organic and inorganic debris generated during the destructive and nondestructive examinations conducted in the HCF, and includes PPE and plastic from decontamination and repackaging activities. The following are examples of materials in this waste stream.

- **Cellulosic** items including: paper, paper wipes, duct tape, cardboard, cotton coveralls, hoods, and gloves, high-efficiency particulate air (HEPA) filter media and frames, pre-filter frames, swipes, masslin cloth, cheese cloth, vacuum cleaner bag, absorbent pads, and wood chips.
- **Plastic** materials including: tyvek coveralls and booties, Saranex coveralls, Herculite cloth, bottles, jars, buckets, dishes, pipettes, tygon tubing, pipe, bags, filter cartridges, sheeting, vials, tape, synthetic mop head, and epoxy residue.
- **Rubber** items including: non-leaded glovebox gloves, nitrile and latex gloves, gloves and booties, tubing, foam rubber, wire/cord insulation, O-rings, and gaskets.
- **Other inorganic items** including: glass swipe dishes, jars, vials, lens, and other lab glassware; Absorbents including Aquaset, Quik-solid, and kitty litter types.
- **Metal** items (ferrous materials) including: stainless steel hardware, steel cans, buckets, foils, plates, trays, equipment, machinery, electronics with steel parts, filters, tubing, fittings, rods, brillo pads, and tools.

- **Non-ferrous metals** including: aluminum, brass, copper, lead, and silver. Items include foils, tools, wire, rods, tubing, fittings, gaskets, gauges, and plates

In addition to the debris materials described above, waste stream ID-SNL-HCF-S5400 may also contain lesser amounts (less than 50 percent in any container) of homogeneous organic and inorganic materials. These materials may include clay and vermiculite based absorbents used during the neutralization and solidification of liquids, and solidification agents such as Quik Solid and Aquaset used to immobilize small amounts of acidic solutions.

Point of Generation: SNL/NM Building 6580, Decontamination of the HCF

Area and/or Building of Generation: Glovebox Laboratory (GBL), Steel Containment Boxes (SCBs), and Zone 2A of HCF

Generating Processes

Description of Waste Generating Processes

The HCF in the basement of Building 6580 has been providing essential support for the reactor and other radiation facilities within Technical Area V (TA-V) since the early 1960's. In 1984, a major modification was conducted to provide additional hot cell facilities and systems in Building 6580 and to increase the capabilities of the existing HCF. The materials in waste stream ID-SNL-HCF-S5400 were generated during the repackaging of materials resulting primarily from pre- and post- test processes associated with reactor fuel studies conducted in the GBL, SCBs, and Zone 2A of the HCF conducted during the late 1970s to mid-1990s timeframe. These studies primarily involved the preparation of light water reactor (LWR) and liquid metal fast breeder reactor (LMFBR) experimental assemblies to be irradiated in the SNL/NM reactors to simulate severe accident scenarios. Following irradiation, the HCF capabilities allowed for post-irradiation examination of these assemblies. The data generated from many of these experiments was used by SNL/NM in the development of the Methods for Estimation of Leakages and Consequences of Releases (MELCOR) computer software that models the complex physical phenomena that occur in a nuclear power plant accident. Work began on MELCOR in 1982, with the first widely distributed release of the software in 1989.

Details of HCF operations depend on specific experiment and project requirements. All involve either radioactive materials, fissile materials, or both. Types of operations conducted in the SCBs, Zone 2A, and the gloveboxes included packaging and unpackaging materials; loading materials into experiment packages; disassembly of irradiated and unirradiated packages and experiments containing radioactive or fissile materials; cutting, sectioning, coring, potting, mounting, grinding, polishing, and coating samples and materials for microscopic and other analytical examination; photography of samples; gamma counting and other radiation-emission analytical examinations; "wet" chemical and other chemical operations; and physical properties measurements. Due to the research and development nature of the projects conducted in the HCF, development of a comprehensive process flow diagram

was not feasible; however, the physical, chemical, and radiological properties of waste items was assessed to ensure that these items were consistent with the activities that were determined to generate TRU waste materials. The AK record was reviewed to compile a comprehensive list of chemicals and materials used during historic operations that may be contained in the waste stream. See Section **RCRA Determinations – Hazardous Waste Determinations** for a summary of the physical, chemical, and radiological characterization of waste stream ID-SNL-HCF-S5400.

Review of the AK record identified the primary research programs conducted in the SCBs, Zone 2A, and GBL described below. Waste from the SCBs and Zone 2A of the HCF primarily resulted from four experiments conducted from 1986 to 1993. These four experiments were: Melt Progression (MP) experiments, the Source Term (ST) experiments, the Damaged Fuel (DF) experiment, and the New Production Reactor (NPR) experiments. The Fuel Disruption (FD), Effective Equation of State (EEOS), Sandia Transient Axial Relocation (STAR), and Fission Activated Laser Concept (FALCON) programs were primarily conducted in the GBL and adjacent supporting areas.

Melt Progression

The MP program included two experiments irradiated in the Annular Core Research Reactor (ACRR). MP-I was irradiated in 1989, and MP-2 was irradiated in 1992. These experiments were designed to investigate the successive melting and solidification of core materials found in a LWR during a severe accident. The initial geometry of the test section was built to simulate a partially degraded core based on the findings of the post-accident examination of Three Mile Island, Unit II (TMI) core.

The MP project included the insertion of the test section into the experiment package, which was then subjected to a neutron field in the ACRR. The experiment simulated the continuation of a severe accident beyond the end stage of the TMI accident. Fission heating in the experiment simulated the fission product decay heating of a severe accident. The experiment was allowed to proceed until preset temperature limits on the supporting structures were reached or a preset fraction of the test section material had relocated due to damage. Waste materials from the MP work include post-test preparation for metallurgical examination materials.

Source Term

The focus of the ST program was on the investigation of fission product release under severe accident conditions. Four short rods of non-irradiated fuel and four short rods of previously irradiated fuel were placed in a test section and neutronically heated to 2,400 Kelvin to observe fission product release. The non-irradiated fuel rods were fabricated at Battelle Pacific Northwest Laboratories. The previously irradiated fuel was obtained from the Belgian Reactor 3 Reactor in Mol, Belgium and was reworked in the HCF shielded glovebox. Several sample tubes with filters were sequentially opened and closed during the experiment to collect samples of the released substances. There were two tests run under this program, ST-I performed on April 28, 1987 and ST-2 performed on November 19, 1987. The materials from this program are those generated from the post irradiation examination. This

examination for ST used the SCBs more extensively than any other program and included both a metallurgical examination and a chemical analysis of the filters from the sample tubes core.

Damaged Fuel

In general, the purpose of the DF program was to investigate the initial reaction of intact fuel rods during a severe accident sequence, specifically, a station blackout sequence. There were four tests in the DF experimental program. Of the four tests, only DF-4 included work in the SCBs or Zone 2A. In addition, DF-4 differed from the previous tests done in this series because the geometry of the test section was based on the boiling water reactor (BWR) geometry rather than the pressurized water reactor (PWR) geometry. The DF assembly included non-irradiated fuel enriched to 10% U-235 in zircaloy clad rods. The DF-4 experiment was irradiated on November 21, 1987, and subjected to a neutron flux field in the ACRR for a period of approximately two hours. Wastes included in this waste stream are those generated from the post-test preparation for metallurgical examination.

New Production Reactor

The primary goal of the NPR program tests was to assess the behavior of the fuel under transient, fuel melting conditions. The fuel was a uranium-aluminum alloy and produced significantly less particulate when cutting or polishing than the ceramic fuels. Four tests were conducted under this program, including one without radioactive materials to calibrate the thermal response of using a flooded ACRR cavity. Of the three remaining experiments, one was conducted with non-irradiated fuel and two with high burnup fuel.

All fuel used in the NPR experiments came from the Savannah River Site and was sectioned in HCF to generate samples for performing experiments in the ACRR. The non-irradiated fuel test was irradiated in the ACRR during November, 1991, and the two tests using high burnup fuel occurred between November 1991 and April 1992. Additional fuel cutting and repackaging was performed in the first quarter of 1996 so that the larger fuel section could be returned to Savannah River as part of the HCF decontamination program. This additional work generated some contaminated equipment, lay-down material, and fuel cuttings.

Fuel Disruption (also referred to as Fuel Dynamics)

The purpose of the FD experiments was to determine breeder reactor fuel behavior under a number of disruption models, such as cracking and breakup of solid fuel, liquid state frothing, and radial spray from molten fuel. Between 1977 and 1983, over 30 in-pile experiments were performed in the ACRR to investigate fuel disruption behavior for LMFBR loss of flow (LOF) accidents. In all experiments the timing and mode of the fuel disruption were observed with a high speed camera, enabling detailed comparisons with a fission gas computer modeling program. The project involved the cutting of irradiated breeder reactor fuel. Most of the fuel was irradiated in the late 1960s and early 1970s in the

Experimental Breeder Reactor II (EBR-II). Cutting of the fuel occurred in glove box (GB) 2 in an inert atmosphere, and was performed dry. Glovebox 1 was used to load the fuel pin segments into the test apparatus, prior to irradiation in the ACRR.

Effective Equation of State

The EEOS program consisted of a series of experiments designed to determine the effective vapor pressure from irradiated mixed-oxide reactor fuels heated in closed volume to a very high temperature, simulating LMFBR core disruptive accident conditions. A series of similar EEOS experiments involving unirradiated fuel were conducted in the GBL during 1982 and 1983. Planning of the irradiated fuel experiments began in 1986 and they were completed by 1993.

The experiments involved two separate assemblies containing a pressure cell and calorimeter. Assembly and fueling was done in HCF prior to irradiation at the ACRR. Fueling was performed in shielded glovebox GB 9, with each experiment using 0.9 to 1.5 grams of fuel from an EBR-II irradiated pin. After irradiation, the assemblies were returned to HCF for disassembly and examination. Leak testing was conducted using a bell jar and mass spectrographic technique.

Sandia Transient Axial Relocation

The STAR program was a series of seven in-pile experiments conducted between 1983 and 1985. The objective of the STAR experiment program was to study the transient cladding and fuel relocation during the initiation phase of LMFBR hypothetical accidents. The STAR program was an extension of the FD program that investigated the time and mode of fuel disruption during hypothetical LMFBR accidents.

In these experiments unprotected loss-of-flow accident conditions were simulated, and the accident-induced clad motion and fuel dispersal were recorded using high speed photography. Both unirradiated and irradiated EBR-II fuels were used in the STAR experiments. Assembly and disassembly of the test apparatuses involving single and multiple pins were primarily done in gloveboxes GB 1 and GB 2 in Room 112. Irradiation was performed at the ACRR.

Fission Activated Laser Concept

Sandia was the lead laboratory for the FALCON reactor-driven laser program from 1986 to 1995. The FALCON experiments were a Strategic Defense Determination Organization (SDIO) defense program examining the feasibility of high power systems pumped directly by the energy from a nuclear reactor. In this concept, the highly energetic fission fragments from neutron-induced fission were used to excite a large-volume laser medium. Disassembly and reassembly of the experiment was done in the fume hood located in Room 112. Samples from the experiment were analyzed on the mass spectrometer in GB 9. Fabrication of the fission foils containing enriched uranium used in the experiment were done in Room 203 and are not included in this waste stream.

HCF Decontamination

During 1994, Scientific Ecology Group, Inc. prepared a Decontamination Plan for the HCF. The Decontamination Plan was intended to meet the SNL/NM requirements for decontamination, nuclear safety, as low as reasonably achievable, and waste management activities, by establishing a project organizational structure, levels of authority, and lines of communication (Reference I1030).

This work was to be done as part of HCF routine operations and maintenance. The tentative acceptance criteria for the HCF were based on allowing future work in the area to be conducted with minimal protective clothing and reasonable stay-times. The tentative decontamination criteria were as follows (Reference I1030):

- Removable Alpha Contamination <100 disintegrations per minute (dpm)/100 square centimeters (cm^2)
- Removable Beta-Gamma Contamination <5,000 dpm/100 cm^2
- General Area Dose Rate <5 milliroentgen per hour (mR/hr)

The Scope of Work for the Decontamination Plan included remediation of the following areas: Zone 2A; Zone 2 (also referred to as rooms 111 and 112); reactor rooms 108 and 109; and room 212A, a small room located above reactor room 109 (References I1030 and C1038). The work associated with Zone 2A included decontamination, dismantling, and removal of the SCBs followed by decontamination of the canyon surfaces. Other components in Zone 2A, including the overhead crane, crane rails, overhead components, and floor rails were scheduled to be removed, sectioned and packaged as required. Removal of the interior airlocks was also identified as part of the Zone 2A scope of work.

The primary task associated with Rooms 108 and 109 involved the removal of sources of radioactive waste and loose surface contamination. Special consideration was given for the removal of high activity waste to an outside storage location. Zone 2 (Rooms 111 and 112) included the removal of shielded and low activity gloveboxes. This task included the removal of all debris and equipment from within the gloveboxes.

The nondestructive cleaning unit (NDC) was used sporadically during the HCF decontamination project to decontaminated equipment that was stored in the gloveboxes in Room 112, in the SCBs, and in the general HCF area. The NDC mobile decontamination facility was designed for cleaning hand tools, small parts, and larger items up to 4,000 pounds. The process could handle both metal objects and softer materials such as wood, plastics and rubber. The facility consisted of a decontamination room for cleaning larger objects, a decontamination cell (glovebox) for cleaning tools, small parts and fixtures, a count room, a liquid carbon dioxide (CO_2) storage vessel and compressor, and the ventilation/exhaust system. The decontamination room operated at a negative pressure of 1.5 inches of water vacuum to prevent airborne exhaust of radioactive materials.

The unit used dry compressed air to propel CO_2 pellets (dry ice) onto the contaminated surface. The pellets shatter, flash into dry CO_2 gas and undergo roughly a 10-fold increase in volume upon impact with the surface to be decontaminated. The cleaning action results from the rapidly expanding gas penetrating the surface of the item to be cleaned. Loose particles of contamination were flushed away by expanding gas. Dislodged microscopic particles were captured on the exhaust system air filter, and larger particles that were dislodged fell to the bottom of the containment area and were vacuumed away to dry air filters.

The unit's air filtration system consisted of three sets of filters in series. Ideally, the filters were replaced when the exposure rate at the external filter housing reached 25mR/hr, and exposure rates were not to exceed 200mR/hr.

RCRA Determinations – Hazardous Waste Determinations

SNL/NM has managed the HCF waste in accordance with their waste management practices in compliance with the requirements imposed by the New Mexico Environment Department. Historically, SNL/NM has managed some of the waste in this waste stream as TRU mixed and the remainder TRU non-mixed. Based on a review of SNL/NM historic waste management practices and characterization performed previously, the EPA HWNs assigned to the TRU mixed waste containers have been maintained. The HWNs historically assigned to HCF decontamination TRU waste containers were D005 (barium), D006 (cadmium), D007 (chromium), D008 (lead), D011 (silver), and F005 (toluene). SNL/NM has historically characterized the TRU debris waste on a container basis and segregated specific waste items containing or potentially mixed with hazardous constituents for on-site waste management purposes. This waste stream does consist of containers historically managed by the generator as both mixed and non-mixed based on the hazardous constituents identified for specific containers. All TRU waste materials from the HCF originated from the same process and the waste population would have the same or similar chemical and radiological characterization. For this reason, the characterization of waste stream ID-SNL-HCF-S5400 considered the HWNs assigned by the waste generators to the TRU mixed waste containers and the review of the AK record described below.

The current assignment of EPA HWNs were based on a review of the available AK documentation assessing chemical inputs to the hot cell operations to identify hazardous material potentially contaminating waste stream ID-SNL-HCF-S5400. In addition, MSDSs and other manufacturer information was obtained for the commercial products to determine the presence of RCRA regulated constituents. The following table, Hot Cell Facility Chemical Identification and Use Summary, lists the specific chemicals identified and associated HWNs assigned to the waste. Following the table is a discussion for the basis of assigning the EPA HWNs.

Hot Cell Facility Chemical Identification and Use Summary

Chemical/Material	Use/Description	EPA HWNs
1,2-Dichloroethane (1,2-DCA)	Found in sample analysis of filters from Glovebox 6/7.	D028
1,1,1-Trichloroethane	Found in sample analysis of filters and materials from Gloveboxes 4/5 and 6/7. Used in the HCF.	F002
1,1,2-Trichloro-1,2, 2-trifluoroethane (Freon-113, Freon TF)	Found during sampling of the Tool Decontamination Unit (TDU) micro filter and TDU charcoal filter for Glovebox 9. Used as a solvent in the TDU. Used as a cutting lubricant in Gloveboxes 4-7 and 9. Found during the cleanup of Glovebox 4/5 and 6/7. Used as a coolant during drilling of test section from ST-1 and ST-2. Used as a lubricant for sample polishing for the Damaged Fuel Program and NPR Program.	F002
Arsenic	Found in sample analysis of materials from Gloveboxes 4/5, 6/7 and 9, and the fume hood.	D004
Barium	Found in sample analysis of filters and materials from Gloveboxes 4/5, 6/7 and 9, and the fume hood. Fission product present in analysis of the ST-1 and ST-2 experiments.	D005
Benzene	Found in sample analysis of materials from Glovebox 4/5. Used in the HCF.	F005
Brass	Items found during the cleanup of Gloveboxes 1, 2, and 4/5. Found during the cleanup of SCB 3. Materials present in 005940 TRU-HCF-97-06 C980391 and 005940 TRU-HCF-97-05 C980392.	D008
Cadmium	Cadmium filters and ring used in the pressure cell and the calorimeter for the EEOS experiments. Used in the HCF, possibly in the metal evaporator/coater. Found in sample analysis of filters and materials from Gloveboxes 4/5, 6/7 and 9, and the fume hood. Component of the control rod for the DF-3 experiment. Used in uranium alloy experiments. Present as tramp material in the aluminum alloys used in the New Production Reactor Program.	D006
Carbon tetrachloride	Found in sample analysis of filters from Glovebox 6/7. Used in the unshielded gloveboxes.	D019
Chloroform (trichloromethane)	Used in the HCF.	D022
Chromel/Aluminel (nickel-chromium/nickel-magnesium-aluminum)	Wires used in thermocouples for EEO5, DFR, and ST-2 experiment.	D007
Chromium	Found in sample analysis of filters and materials from Gloveboxes 4/5, 6/7 and 9, and the fume hood. Present as tramp material in the aluminum alloys used in the New Production Reactor Program. Present in the MP-2 prefabricated construction.	D007
Chromium oxide	Used in the EEOS experiments.	D007

Chemical/Material	Use/Description	EPA HWNs
Lead	Found in sample analysis of filters and materials from Gloveboxes 4/5, 6/7 and 9, and the fume hood. Used for shielding in the HCF and in various experiments processed through the HCF. In the form of bricks, blankets, sheets, shot, pellets, wool, pigs, etc. Used as counter weights on manipulator arms. Found in analysis of filter material (HEPAs and prefilters). Used as shielding in the containment and filter structure for the EEOS experiments. Screens and filters used when performing gamma-ray tomography. Possibly present in solder pieces and in electrical components present in waste parcels.	D008
Methylene chloride	Found in sample analysis of filters and materials from Gloveboxes 4/5 and 6/7. Used in the HCF.	F002
Methyl ethyl ketone (MEK)	Found in sample analysis of materials from Gloveboxes 4/5 and 6/7. Used in the HCF.	F005
Mercury	Found in sample analysis of filters and materials from Gloveboxes 4/5, 6/7 and 9, and the fume hood. Mercury vapor lamps used in UV-ozone box in the HCF.	D009
Nichrome oxide	Component of mica used in the EEOS experiments.	D007
Pyridine	Used in the HCF.	F005
Silver	Found in sample analysis of filters and materials from Gloveboxes 4/5, 6/7 and 9, and the fume hood. Wire and coupons used in the ST-1 and ST-2 experiments. Parts used in construction of the ST-1 and ST-2 experiments. Component of the control rod for the DF-3 experiment. Present in the solder used in electronic parts in the HCF and in thermocouples for the EEOS experiments. Present in the Melt Progression Program test section. Possibly present in solder pieces and in electrical components present in waste parcels. Wire used for silver plating present in waste parcels.	D011
Silver chloride	Used in the calibration solution for an ion-selective electrode.	D011
Silver nitrate	Used in the HCF.	D011
Toluene	Used in the unshielded gloveboxes. Found in sample analysis of filters for Gloveboxes 6/7 and 9.	F005
Trichloroethylene (trichloroethene)	Found in sample analysis of filters from Glovebox 6/7. Used to ultrasonically clean EEOS components. Used in the unshielded gloveboxes.	F002

Ignitability, Corrosivity, and Reactivity

The materials in this waste do not exhibit the characteristic of ignitability as defined in 40 CFR 261.21. The materials are not liquid and liquids were not added to containers during packaging. This material will not cause fire through friction, absorption of moisture, or spontaneous chemical changes, and procedures did not allow packaging of pyrophoric materials. This material is not a compressed gas or an oxidizer. Liquids are solidified with absorbent (i.e., Aquaset, Petroset). Although AK indicated absorbents were available for use at SNL/NM, it did not specify any ignitable liquids that were treated. The materials in this waste stream are therefore not ignitable wastes.

The materials in this waste stream do not exhibit the characteristic of corrosivity as defined in 40 CFR 261.22. The materials are not liquid and liquids were not added to containers during packaging. In addition, absorbents (e.g., Aquaset, Petroset) were added to liquids when generated. AK indicated that the HCF used absorbent to solidify nitric acid leachates and ion chromatography solutions. The materials in this waste stream are therefore not corrosive wastes.

The materials in this waste stream do not exhibit the characteristic of reactivity as defined in 40 CFR 261.23. The materials are stable and will not undergo violent chemical change. The materials will not react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors, or fumes when mixed with water. Although sodium and sodium-potassium bonded fuel capsules were disassembled and examined, the sodium and sodium-potassium were removed and neutralized with alcohol (e.g., butyl alcohol) during capsule disassembly or examination. The materials do not contain cyanides or sulfides, and are not capable of detonation or explosive reaction. The materials are not liquid and liquids were not added to containers during packaging. The materials in this waste stream are therefore not reactive wastes.

Based on SNL/NM waste management practices, the materials contained in waste stream ID-SNL-HCF-S5400 do not exhibit the characteristics of ignitability (D001), corrosivity (D002), or reactivity (D003) as defined in 40 CFR 261.21, 261.22, and 261.23, respectively. AK indicated that SNL/NM used Aquaset to solidify nitric acid leachates and ion chromatography solutions. Petroset was available for use during the HCF decontamination, but source documents did not specify liquids it was used to treat. Real-time radiography (RTR) will be used to verify the absence of prohibited materials. Liquids in excess of TSDF-WAC limits and unpunctured aerosol cans will be removed or remediated before shipment to WIPP.

Toxicity Characteristic Constituents

Based on review of AK relative to inputs to the hot cell and glovebox operations conducted in the HCF, waste stream ID-SNL-HCF-S5400 is contaminated with toxicity characteristic compounds as defined in 40 CFR 261.24. Where a constituent has been identified and there is no or limited quantitative data available to demonstrate that the concentration of a constituent is below regulatory threshold levels, the applicable EPA HWN is applied to the waste stream.

Heterogeneous debris waste from the HCF contains or is contaminated with toxicity characteristic metals. EPA HWNs D004, D005, D006, D007, D008, D009, and D011 are assigned to waste stream ID-SNL-HCF-S5400.

The AK sources identified the use of organic toxicity characteristic compounds, including benzene (D018), carbon tetrachloride (D019), chloroform (D022), 1,2-dichloroethane (D028), methyl ethyl ketone (D035), pyridine (D038), and trichloroethylene (D040). Trichloroethylene is identified as an F-listed

solvent and is assigned EPA HWN F002. Specific uses were not found in the AK for benzene, methyl ethyl ketone, and pyridine, therefore EPA HWN F005 was assigned for these compounds. Because the more specific F-listed EPA HWNs have been assigned for these compounds, assignment of the corresponding toxicity characteristic HWNs (D018, D035, D038, and D040) is not necessary. HWNs D019, D022, and D028 are assigned to waste stream ID-SNL-HCF-S5400.

F-Listed Constituents

Based on review of AK relative to inputs to waste stream ID-SNL-HCF-S5400 may contain or be mixed with F-listed hazardous wastes from nonspecific sources listed in 40 CFR 261.31. F002 and F005 listed solvents were used in operations conducted in the HCF. F001 constituents, including methylene chloride, 1,1,1-trichloroethane, trichloroethylene, 1,1,2-trichloro-1,2, 2-trifluoroethane, and carbon tetrachloride were used in HCF operations. However, EPA has provided a regulatory clarification that the F001-listing is only appropriate when listed solvents are used in a large-scale degreasing operation, such as cold cleaning or vapor degreasing on an industrial scale. This waste was not generated from large-scale degreasing operations, and therefore, EPA HWN F001 will not be assigned to the waste stream. F003 constituents, including acetone, butyl alcohol, ethanol, methanol, methyl isobutyl ketone, and xylene are listed solely because these solvents are ignitable in liquid form. The waste stream does not exhibit the characteristic of ignitability because it is not liquid; therefore, F003 is not assigned. Waste stream ID-SNL-HCF-S5400 is assigned F-listed EPA HWN F002 for methylene chloride, 1,1,1-trichloroethane, trichloroethylene, and 1,1,2-trichloro-1,2, 2-trifluoroethane. Waste stream ID-SNL-HCF-S5400 is also assigned F-listed HWN F005 for benzene, methyl ethyl ketone, pyridine, and toluene. Trichlorofluoromethane (Freon-11) was used as a fuel stimulant, not as a solvent, and therefore HWN F002 was not assigned for this chemical.

P-, U-, and K-Listed Wastes

Based on review of AK relative to inputs to the HCF process, decontamination, and waste repackaging operations, waste stream ID-SNL-HCF-S5400 does not contain and is not mixed with a discarded commercial chemical product, an off-specification commercial chemical product, or a container residue or spill residue thereof as defined in 40 CFR 261.33.

Beryllium was in the HCF in the form of an oxide. The identified source of beryllium in the AK record indicates that solid beryllium oxide was used as a thermocouple insulator in DFR experiments. Since beryllium powder, was not utilized the waste stream does not meet the definition of P015 as defined in 40 CFR 261.33.

The review of the AK source documentation did not identify the disposal of unused hydrofluoric acid (U134) or disposal of materials contaminated with spills of this acid; therefore the EPA HWN U134 is not assigned to waste stream ID-SNL-HCF-S5400.

Waste stream ID-SNL-HCF-S5400 does not include any of the manufacturing process wastes from the specific industries or sources listed in 40 CFR 261.32
Waste Stream ID-SNL-HCF-S5400 is not assigned any U-, K-, or P-Listed EPA HWNs.

Other Waste Streams generated from the Same Buildings and Processes

Currently, there is no other approved waste stream generated from the HCF.

Polychlorinated Biphenyls

Based on the review of AK, it was determined that one container potentially contains PCBs. Drum SNL/NM006418 was found to contain small capacitors. The capacitors were determined to be dry based on manufacturer specifications or RTR. Only one of the capacitors could be confirmed not to contain PCBs, while the PCB content of the other capacitors could not be determined. These capacitors are assumed to be PCB articles and therefore will be managed as a Toxic Substances Control Act (TSCA) waste under 40 CFR 761. This drum, in addition to any other potentially PCB-contaminated electrical equipment (e.g., transformers, ballasts, capacitors, etc.) identified during RTR will be managed in accordance with PCB disposal requirements of the WIPP-WAC. Since SNL/NM is not listed in Section 3.5.6 of the WIPP-WAC as one of the authorized sites to ship waste containing PCBs to WIPP, CBFO made a determination regarding the acceptability of the waste subject to NEPA review, as appropriate to ship the waste to Idaho. Idaho is approved to ship PCB's to WIPP.

Prohibited Items

The absence of prohibited items is determined and documented through acceptable knowledge and characterization activities. RTR was performed on each container to verify the absence of prohibited items. The following items have been determined as not present in the waste:

- Liquid waste
- Non-radioactive pyrophoric materials
- Hazardous wastes not occurring as co-contaminants with TRU mixed wastes (non-mixed hazardous waste)
- Waste incompatible with backfill, seal and panel closure materials, container and packaging materials, or other wastes
- Explosives or compressed gases
- Waste with PCBs not authorized under an EPA PCB waste disposal authorization
- Waste exhibiting the characteristics of ignitability, corrosivity, or reactivity
- Waste that has ever been managed as high-level waste and waste from tanks specified in Table C-8 of the WIPP HWFP, unless specifically approved through a Class 3 permit modification.

Each container of waste is certified and shipped to WIPP only after RTR:

- Did not identify any prohibited items in the waste container, or
- All prohibited items found in a waste container by RTR are identified and corrected (i.e., eliminated or removed) through the site non-conformance reporting system.

Justification for the Selection of Radiography or Visual Examination

Radiography was used to examine this waste stream because the waste was previously packaged and radiography is an accepted method to meet all the Data Quality Objectives for NDE of waste stream ID-SNL-HCF-S5400.

Method for Determining Waste Material Parameters (WMPs) Weights Per Unit of Waste

WMP estimates for waste stream ID-SNL-HCF-5400 were based on review of the repackaging videos and disposal request documentation for TRU waste generated during decontamination of the SNL/NM HCF in Building 6580. The WMP weight percentages were estimated primarily by reviewing the repackaging videos taken between September 2007 and November 2008. Since container paperwork did not indicate weights for individual items placed in a parcel or drum, these weights were estimated based on narrative from the video and observation. The net weight of the parcels or drums was taken from the SNL Radioactive Waste/Nuclear Material Disposition Department Radiological Form included in the Disposal Request documentation. The WMP data is presented below.

Waste Stream ID-SNL-HCF-S5400 Waste Material Parameters

Waste Material Parameter	Average Weight Percent (Wt%)	Wt% Range
Iron-based Metals/Alloys	43.9%	0.5% - 75.0%
Aluminum-based Metals/Alloys	0.6%	0.0% - 1.0%
Other Metals	1.0%	0.0% - 5.0%
Other Inorganic Materials	0.7%	0.0% - 5.0%
Cellulosics	14.5%	1.0% - 40.0%
Rubber	3.8%	0.0% - 9.5%
Plastic (waste materials)	35.2%	20.0% - 68.0%
Inorganic Material	0.0%	0.0% - 0.0%
Organic Material	0.0%	0.0% - 0.0%
Soils/Gravel	0.3%	0.0% - 0.5%
Total Inorganic Waste Average	**46.5%**	
Total Organic Waste Average	**53.5%**	

List of AK Sufficiency Determinations

There are no AK sufficiency determination requests for this waste stream.

Transportation

This waste stream meets the requirements for TRUCON codes SQ125/SQ225.

Beryllium

Beryllium was in the HCF as an oxide. The identified sources of beryllium in the AK record do not indicate that significant quantities of beryllium were utilized. Based on the identified presence and use of beryllium, beryllium is not expected to exceed one percent in any payload container.

Radionuclide Information

To compile a summary of generator reported radionuclide data for waste stream ID-SNL-HCF-S5400, the most recent NDA data were used for the three drums currently at INL. These data were generated prior to shipment to INL, in October and December 2010, using SNL's Canberra Qualitative and Quantitative (Q^2)drum counter and reviewed by CCP. The table below indicates the waste is contaminated mainly with plutonium (Pu-238,Pu-239, Pu-240, and Pu-241), americium (Am-241), cesium (Cs-137), and strontium (Sr-90), and lesser quantities of uranium (U-234, U-235, and U-238), silver (Ag-108), cobalt (Co-60), curium (Cm-244), cesium (Cs-134), europium (Eu-152, Eu-154, and Eu-155), neptunium (Np-237), protactinium (Pa-233), lead (Pb-210), polonium (Po-210), radium (Ra-226 and Ra-228), and thorium (Th-228, Th-232, and Th-234). The two predominant isotopes by weight in this waste stream are U-238 and U-235.

Payload management will not be utilized for this waste stream.

Waste Stream ID-SNL-HCF-S5400 Reported Radionuclides

Radio-nuclide	Number of Contain-ers with Reported Radio-nuclide	Total Radio-nuclide Weight% [1,6]	Total Radio-nuclide Curie% [2,6]	Radionuclide Weight% Range for Individual Containers [3,6]	Radionuclide Curie% Range for Individual Containers [4,6]	Expected Present
WIPP Required Radionuclides						
Am-241	3	0.01%	8.09%	0.01% - 2.50%	2.66% - 9.89%	Yes
Pu-238	2	Trace	0.26%	0.00% - 0.05%	0.00% - 2.17%	Yes
Pu-239	3	2.72%	47.34%	2.51% - 5.92%	0.05% - 63.89%	Yes
Pu-240	3	0.09%	5.43%	0.07% - 0.62%	0.04% - 14.67%	Yes
Pu-242	2	Trace	Trace	0.00% - 0.28%	0.00% - Trace	Yes
U-233	0	0.00%	0.00%	0.00% - 0.00%	0.00% - 0.00%	Yes
U-234	3	0.09%	0.15%	0.08% - 0.19%	Trace - 0.19%	Yes
U-238	3	82.47%	0.01%	73.49% - 87.64%	Trace - 0.01%	Yes
Cs-137	3	Trace	14.27%	Trace - 2.81%	Trace - 75.93%	Yes
Sr-90	3	Trace	3.89%	Trace - 0.48%	Trace - 20.27%	Yes
Additional Radionuclides						
Ag-108	1	Trace	Trace	0.00% - Trace	0.00% - 0.01%	Yes
Co-60	1	Trace	Trace	0.00% - Trace	0.00% - Trace	Yes
Cm-244	1	Trace	0.01%	0.00% - Trace	0.00% - 0.04%	Yes
Cs-134	1	Trace	Trace	0.00% - Trace	0.00% - Trace	Yes
Eu-152	1	Trace	Trace	0.00% - Trace	0.00% - Trace	Yes
Eu-154	2	Trace	0.13%	0.00% - 0.01%	0.00% - 0.68%	Yes
Eu-155	1	Trace	0.01%	0.00% - Trace	0.00% - 0.04%	Yes
Np-237	2	Trace	Trace	0.00% - Trace	0.00% - Trace	Yes
Pa-233	2	Trace	Trace	0.00% - Trace	0.00% - Trace	Yes
Pb-210	1	Trace	Trace	0.00% - Trace	0.00% - Trace	Yes
Po-210	1	Trace	Trace	0.00% - Trace	0.00% - Trace	Yes
Pu-241	2	Trace	20.39%	0.00% - Trace	0.00% - 26.61%	Yes
Ra-226	1	Trace	Trace	0.00% - Trace	0.00% - Trace	Yes
Ra-228	1	Trace	Trace	0.00% - Trace	0.00% - Trace	Yes
Th-228	1	Trace	Trace	0.00% - Trace	0.00% - Trace	Yes
Th-232	1	6.33%	Trace	0.00% - 6.75%	0.00% - Trace	Yes
Th-234	3	Trace	0.01%	Trace - Trace	Trace - 0.01%	Yes
U-235	3	8.29%	0.01%	2.84% - 20.03%	Trace - 0.01%	Yes

1. This listing indicates the total weight percent of each radionuclide over the entire waste stream.
2. This listing indicates the total activity (curie) percent of each radionuclide over the entire waste stream.
3. This listing is the weight percent range of each radionuclide on a container-by-container basis.
4. This listing is the curie percent range of each radionuclide on a container-by-container basis.
5. U-233 was not reported but is expected to be present from the decay of Pu-241.
6. "Trace" indicates less than 0.01 weight percent or activity percent for that radionuclide.

AK SOURCE DOCUMENTS

Tracking Number	Title	Document Number	Date
C1001	Memo from Gwendolyn J. Pirtle to Charles G. Thomas, David S. Barber, and Carlos S. Medrano re: Hot Cell Facility Decontamination	NA	05/04/1995
C1002	Letter from Ted R. Schmidt, Manager of Reactor Development and Applications Department, to A.R. Chernoff re: Sandia Hot Cell Facility Operational Safety Requirements Addendum	NA	12/12/1990
C1003	Memos relating to the Nondestructivce Cleaning Rental and H&S Information	NA	1995
C1004	Reactor Accident Experiments and Funding	NA	Summer 1978
C1005	Memo from Cathy A. Ottinger re: Candidate Auxiliary Hot Cell Facility Containers	NA	02/09/1999
C1006	Memo from F. Gonzalez and D. Fenstermcher to S. Wright re: Loading of Experiment FD4.4 and FD4.5	NA	11/17/1982
C1008	Memo from D.M. Haaland to R.L. Coats re: High Temperature Equation-of-State Studies of Fast Breeder Reactor Fuels: Evaluations Summary	NA	08/14/1975
C1009	Memo from K.T. Stacicer to Picard re: Radiometric Temperature Measurement	NA	02/12/1983
C1010	Memos, re: SRSC, ACRR, ACPR, RCSC, & ACPR Meeting Minutes; TRAN-GAP Fuel Loading Procedure and Approval; Fuel Loading Procedures for Exp in Bldg. 6597; Removal and Encapsulation of ST-1 Fuel Assembly; ST-1 Cutting Procedure; Handling Procedures for WLM Ex	C010	04/75 to 1989
C1011	Memo: Explosive Valves in the ST-2 Experiment	C011	November 2, 1987
C1012	Memos: draft Section 5 and 6 of the ARSR quartery reports	C012	February 1983
C1013	Memo: Suggested Instrumentation for the Fuel Disruption Tests	NA	January 13, 1982
C1014	Memos: Working Document for Preliminary DFR Test Section Design Concepts; DFR Visual Diagnostics; Preliminary Calculations for the DFR Steam System	C014	September 28, 1981
C1015	Memo: Hydrogen Flow in DFR-PWR Experiments	C015	February 10, 1984
C1016	Memo: Fission Product Release Rates for Proposed DFR Pre-Trradiared Fuel Experiments	C016	December 22, 1982

Tracking Number	Title	Document Number	Date
C1017	Memo: Preliminary Evaluation of Pre-Irradiated Fuel Experiments for the DFR Program	C017	February 7, 1983
C1018	Sandia Hot Cell Facility Operational Safety Requirements Addendum and associated memos	SAND88-1723 Addendum	12/12/1990
C1019	Memo from J. A. Reuscher re: Handling and Accountability of Special Nuclear Materials in TA-V	NA	02/15/1979
C1020	Memo from Susan Bourcier, SNL to Manny Trujillo and Tanio Hake re: ST 1/2 SNM Accountability Closeout	NA	06/20/1995
C1021	Memo from Susawn Longley to File re: Characterization of waste from Glove Box 9	NA	02/05/1997
C1022	Memo from Michael Enghauser to Susan Longley re: Characterizatoin of HCFRW1, HCFRW5, and KC95-02	NA	09/11/1996
C1023	Memo from Susan Longley to Sherron Hirdman re: Transuranic activity levels in waste from glove boxes 1/2 and 9	NA	02/12/1997
C1024	Memo from Michael Enghauser to Susan Longley re: Characterization of GB1CAN1, GB1CAN2, GB1CAN3	NA	09/12/1996
C1025	Memos Concerning a 2 kg. Pu-239 puck to be transferred from SNL to LANL.	NA	03/01/1995
C1026	Memo Concerning Revision to SNLA Application for Acceptance of LLW at NTS	NA	09/09/1994
C1027	Memo Concerning Management Readiness Review of Pu Repackaging Project at the RMWMF	NA	11/02/2000
C1028	Memo Concerning Independent Surveillance Report	NA	06/28/1995
C1029	Memo Concerning Area V Hot Cell Glove Box Waste Characterization	NA	07/18/1995
C1030	Memo Concerning the Characterization of Samples LSAs #1573 (19000902), #1560 (19000903), #1559 (19000904), #1572 (19000905), #1564 (19000906), and #1575 (19000910)	NA	01/28/2002
C1031	In-Pile Vapor Pressure Measurements on UO_2 and (U, Pu)O_2	KfK3939	08/1985
C1032	Preparation of Gas Sampling Cylinders for Waste Packaging at the TA-V Hot Cell Facility (HCF)	005963	07/31/1997
C1033	Characterization of Sample LSA Box 1561	NA	08/01/2001

Tracking Number	Title	Document Number	Date
C1034	Characterization of Samples SAF-T-drums #503047 (19000907) and #503048 (19000908)	NA	01/29/2002
C1035	Characterization of Sample Metal Shield and Bracket/Cavity (19000909)	NA	01/30/2002
C1036	Status of Sandia's Disposition Program	NA	07/15/1996
C1037	Ken Reil Interview; Betty Humphrey	NA	2/19/2008
C1038	Ken Reil Interview; John Kleckner	NA	2/3/2010
C1039	Waste Material Parameter Memorandum for Waste Stream SNL-HCF-S5400	NA	2/1/2010
C1040	Memo re: Changes to SRS-NPR Irradiated Fuel Sample Cutting Instructions; Letter from SRS to Argonne, re: Information on the MK22/K-13 Fuel Assemblies; SNL Memo, re: Closeout of Modification/Expenditure Form No. 2691 (XR2 recovered depleted fuel pellets)	NA	1991; 09/12/1989
C1041	Memos re: Falcon Experiment procedure; Summary of Action Items from August 2, 1984 Meeting; Modification of Hot Cell Bell Jar/Mass Spec	NA	08/03/1984; 1986
C1042	Memorandum to Ines Triay: Determination and Findings, Defense Origin of Nuclear Waste, Kerr-McGee Waste	NA	4/15/2005
C1043	Memorandum to CCP Central Records, Evaluation of Kerr-McGee Fuel Production and FFTF History	NA	6/28/2004
DR1001	Discrepancy resolution for the assignment of EPA Hazardous Waste Numbers	NA	02/15/2011
DR1003	Discrepancy Resolution: Assignment of EPA Hazardous Waste Numbers	Revision 1	8/122011
I1001	EEOS Mass of Cadmium, Lead, and Remaining Package	NA	NA
I1002	Experiment Plan for Effective Equation of State (EEOS) Experiments with Irradiated Fuel	I002	January 1986
I1003	Design of EEOS Pressure Cell and In-Pile Calorimeter	NA	NA
I1004	Damaged Fuel Relocation Experiment DF-2: Results and Analyses	SAND86-1441	December 1989
I1005	Damaged Fuel Experiment DF-4: Test Result Report	NA	NA

Tracking Number	Title	Document Number	Date
I1006	Summary of Heating Conditions and Disruption for Each Fuel Disruption Experiment	NA	October 1981
I1007	Fuel Disruption Notes: FD1, FD2, HRR, FF and IF FF	NA	NA
I1009	Fuel Disruption Experiment Plan for the FD2/4 Series	NA	July 1981
I1010	ACRR Source Term Tests, Project Overview	NA	NA
I1011	ST-2 Operation Checklist	Number 19 through 21	11/19/1987
I1012	Star-5 Quick Look Report	NA	06/27/1985
I1013	STAR-6 Very Short Quick Look Report	NA	NA
I1014	Non Destructive Cleaning, Mobile Decontamination Unit, Narrative Log	NA	08/01/1995
I1015	Effective Equation of State Experiments	5222	NA
I1016	ACRR Source Term Experiments, Program Overview	NA	NA
I1017	Annular Core Research Reactor Experiment Plan	NA	08/26/1983
I1018	Project/ Experiment Quality Plan for Damaged Fuel Relocation (DFR)	Form RREP-II-5-1	06/01/1983
I1019	Annual Core Pulse Reactor Experiment Plan for EEOS with Report (EEOS Experiments)	NA	03/31/1975
I1020	Analysis of the DF-1 Experiments using SCDAP	I020	August 198S
I1021	Damaged Fuel Relocation (DFR) Experiments Damage Fuel (DF) Series ACRR Experiment Plan	I021	July 1983
I1022	Handwritten Notes of a proposal for an Experimental Program	NA	NA
I1023	Catalog pages of Hardware for the Source Term Experiments	NA	NA
I1024	Detailed ST-2 Procedures and Gas Manifold Operations; ST-1 Procedures for Gas Manifold Operation; Procedure for Gas Manifold Operation for ST-2	NA	November 1987
I1025	Project/Experiment Quality Plan for ACRR Source Term Experiments	RREP-II-5-1	March 1986
I1026	Severe Accident Source Term Information Needs and Capabilities	NA	April 9-11, 1984
I1027	Notes of Ken Reil regarding severe accident experiments.	NA	August 27, 1982

Tracking Number	Title	Document Number	Date
I1028	Damaged Fuel Relocation (DFR) Experiments: Damaged Fuel (DF) Series DF-2 ACRR Experiment Plan	NA	August 1984
I1030	Hot Cell Facility (HCF) Decontamination Plan	NA	December 13, 1994
I1031	DF-2 Experiment Quick Look Report	NA	NA
I1032	Notes describing the differences between DF-1 and DF-2 Experiments	NA	NA
I1033	Procedures for Gas Manifold Operation, Leak Rate Measurement (Room 107 and Hot Cell) and Back Fill Operations for ST-1.	NA	NA
I1034	ST-1 Procedures in Hot Cell	NA	NA
I1035	Hot Cell Requirements for the Source Term Experiments	NA	NA
I1036	Safe Operating Procedures for Source Term Outside Cask Handling Operations	NA	NA
I1037	Operational Safety Requirements for the Hot Cell Facility	NA	September 24, 1986
I1038	Safe Operating Procedures for the Hot Cell Facility in the Basement of Building 6580	NA	December 1986
I1039	ST-1 Filter Wire Analysis Procedures	NA	NA
I1040	HCF Procedures for the Recovery of the Fuel/Target and gas sample bottles from the NPR C Series	NA	April 6, 1992
I1041	AHCF Campaign Planning Procedure	AP/AHCF-CT/04-001	NA
I1042	Work Instructions for Repackaging TRU Waste at Sandia National Laboratories/New Mexico DRAFT	SNL-WP-001, R0	NA
I1043	New Production Reactor Program QA Manual	NA	08/28/1992
I1044	Quality Assurance Program Experiment Requirements Annular Core Research Reactor Facility	NA	NA
I1045	Core Operating Documents: Administrative Procedures, Instructions, Guidelines, and Directives	AHCF/AP/01	12/01/04
I1046	Characterization of Excess Lead	6432 OP-03-002	August 6, 2003
I1047	Radioactive Material Handling and Storage	6782 AP/04-001	05/27/2005

Tracking Number	Title	Document Number	Date
I1048	Lead Characterization and Repackaging	CHAR/AHCF COP/2004-01	NA
I1049	Radioactive Material Inventory Control Procedure	NDC-OP-2	July 24, 1995
I1050	Decontamination Operation Procedure	NDC-OP-1	08/01/1995
I1051	Equipment Decontamination Request Instruction	NDC-INST-1	07/28/95
I1052	NDC Instruction Facility Maintenance Request Instruction	NDC-INST-2	07/20/1995
I1053	Transuranic Waste Repackaging Plan	NA	04/30/2008
I1054	Radioactive Material Handling and Storage in the RML	RML-AP-001	NA
M1001	Sandia National Laboratories Primary Hazard Screening (PHS)	SNL9A00349-007	07/08/2003
M1002	Sandia National Laboratories Primary Hazard Screening (PHS)	PHS Number: SNL9A00349-006	05/19/2003
M1003	Hazards Analysis (HA): Hot Cell Facility	SNL9A00349-006	May 27, 2003
M1004	Radiological Survey Form for Post Job and Lead Brick Release and associated supporting data	NA	03/22/1996
M1005	NDC Operations Logs, Decontamination Operations Checklists, Equipment Decontamination Requests	NA	1995 through 1996
M1006	Completed Equipment Decontamination Requests; Radiological Work Permits; Decontamination Operations Checklists, etc. for NDC Trailer	NA	1995
M1007	Collection of MSDSs	NA	Various
M1010	Disposal Request #005934	NA	March 31, 1998
M1011	Disposal Request #005934	NA	March 31, 1998
M1012	AHCF Instrument and Detection Slides	NA	NA
M1013	Review of TRU Disposal Requests: 001179, 005934, 005939, 005940, 007242, 994027, 994506, 994655, 204041, 204073, 204114, 204256, 041213, 061080	NA	NA
M1014	Readiness Assessment Plan for the Non-Destructive Cleaning Mobile Decontamination Unit	NA	July 20, 1995
M1015	Miscellaneous Articles and Public Extracts	NA	1976 to 2008, not inclusive

Tracking Number	Title	Document Number	Date
M1016	Disposal Requests related to HCF TRU Waste	NA	Various
M1019	Collection of Spreadsheets listing inital HCF CH and RH TRU Waste Inventories and Miscellaneous Data	NA	Various
M1020	Process Knowledge Evaluations (PKE) for radiological ratios (e.g., PKE000044 and PKE000047)	NA	Various
M1021	Memo to Record, re: Evaluation of Radionuclide Activity Ratios for Hot Cell Facility Wastes (PKE000044 and PKE000047); Memo to Record, re: PKE000047 Radionuclide Activity Ratios	NA	06/24/2004; 06/24/2004
M1022	CCP reviewed NDA data based on Sandia Q^2 Drum Counter	SNL Radiation Protection Sample Diagnostics Program	October 2010
P1001	Contamination Control in Sandia Equation of State Experiments	SAND80-1277	October 1980
P1002	In-Pile Calorimetry in the Joint Sandia/KfK Equation of State Experiments on Nuclear Fuel	SAND80-2575	February 1981
P1003	A Model for Effective Equation of State of Irradiated Fast Reactor Fuel	NA	July 9, 1991
P1004	Joint In-Pile Equations of State Series on Nuclear Fuels at Sandia National Laboratories	SAND80-1794	November 1980
P1005	Vapor Pressure Measurements on Liquid Uranium Oxide and (U,Pu) Mixed Oxide	NA	January 1989
P1006	Measurements of the Total Pressure from Irradiated (U,Pu) Mixed Oxide	NA	August 1990
P1007	Proceedings of the International ANS/ENS Topical Meeting on Thermal Reactor Safety, Results of the ACRR-DFR Experiments	ISBN Number 0-89448-121-5 Volume 3	February 2-6, 1986
P1008	In-Pile Vapor Pressure Measurements on $(U)O_2$ and $(U,Pu)O_2$	Kfk 3939	August 1985
P1009	Analysis of Mixed Oxide Fuel Irradiated in EBR-II Measured as Predicted Burn-Up	HEDL-TME 77-60, UC-79b	May 1978
P1010	In-Pile Determination of Fuel Disruption Mechanisms under LMFBR LOF Accident Conditions		October 1985
P1011	The DF-4 Fuel Damage Experiment in ACRR with a BWR Control Blade and Channel Box	NUREG/CR-4671, SAND86-1443	November 1989

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P1012	Fuel-Disruption Experiments Under High-Ramp-Rate Heating Conditions	NUREG/CR-3662, SAND81-0413	October 1983
P1013	Technical Safety Requirements for the Auxiliary Hot Cell Facility	SAND2003-4491	February 2004
P1014	Fission Rates, Burnup, and Neutron Flux-Fluence-Spectra Characterization for Mixed Oxide Fuel Experiments in the EBR-II	HEDL-TME 75-74, UC-79b,d	January 1976
P1015	Sampling and Analysis Plan for Characterization of Waste Arising From Hot Cell Facility Glovebox Decontamination	PLA 95-28	October 12, 1995
P1016	In-Pile Observation of Fuel and Clad Relocation During LMFBR Core-Disruptive Accidents	SAND 86-1416	April 1989
P1018	Fission Product Release and Fuel Behavior of Irradiated Light Water Reactor Fuel Under Severe Accident Conditions, The ST-1 Experiment	NA	November 1990
P1019	DOE Reactor-Pumped Laser Program	SAND93-27196	NA
P1020	FALCON Reactor-Driven Laser Experiments Show Potential	NA	October 1991
P1021	Fission Activated Laser as Primary Power for CW Laser	SAND93-1524C	December 1993
P1022	Damaged Fuel Experiment DF-1	SAND86-1030	January 1990
P1023	Design and Performance Characteristics of the Annular Core Research Reactor	SAND79-0129C	1978
P1024	Utilization of the Sandia ACRR as a Fast Reactor Safety Test Facility	SAND79-0109A	1978
P1025	ACRR Fission Product Release Tests: ST-1 and ST-2	SAND88-0597C	August 1988
P1026	LMFBR Mixed Oxide Fuels Development Semi-Annual Report, July-December 1975	HEDL-TME 76-24	February 1976
P1027	Fabrication, Irradiation, and Post-Irradiation Examination of Mixed Oxide Fuel Pins, PNL-3-23, 27, and 33	HEDL-TME 76-6	January 1976
P1028	Leak Path Factor Evaluation: A MELCOR Application for Nonreactor Nuclear Facilities	WSRC-MS-2004-00296	NA
P1029	Highly Enriched Uranium Working Group Report on Environmental Safety and Health Vulnerabilities Associated with the Departments Storage of Highly Enriched Uranium	DOE/EH-0525	December 1996
P1030	Plutonium, The First 50 Years	NA	NA

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P1031	Modifications to MELCOR for the Analysis of Heavy-Water Moderated, U-Al Fuel Reactors	WSRC-MS 90-9	May 11, 1990
P1032	Uncertainty Analyses Using the MELCOR Severe Accident Analysis Code	NA	NA
P1033	Guernsey Fast Reactor Safety Topical In-Pile Observations of Fuel and Clad Relocation During LMFBR Initiation Phase Accident Experiments, The STAR Experiments	SAND 8S-1279C	NA
P1034	Visual Observations of Fuel Disruption in In-Pile LMFBR Accident Experiments	SAND 81-2246C	NA
P1035	Analysis of In-Pile Fuel Disruption Experiments	SAND78-0363C	February 1978
P1036	Visual In-Pile Fuel Disruption Experiments	SAND 78-0515C	NA
P1037	First Visual In-Pile Fuel Disruption Experiments	SAN 78-0266C or SAND 78-0622	NA
P1038	Visual Investigation of Reactor Fuels Response to Simulated LOF Heating Conditions, First Series	SAND79-0940	October 1979
P1039	Fuel Disruption Mechanisms Determined In-Pile in the ACRR	SAND83-1750	September 1984
P1040	In-Core Fuel Disruption Experiments Simulating LOF Accidents for Homogeneous and Heterogeneous Core LMFBRs: FD2/4 Series	SAND82-0136C	NA
P1041	Sandia National Laboratories/New Mexico Environmental Information Document, Volume II	SAND99-2022/2	September 1999
P1042	Sandia National Laboratories/New Mexico, Environmental Information Document, Volume I	SAND99-2022/2	September 1999
P1043	Summary of MELCOR 1.8.2 Calculations for Three LOCA Sequences (AG, S2D, and S3D) at the Slurry Plant	SAND93-2042	March 1994
P1044	The Department of Energy's Tritium Production Program	RL30425	November 2, 2001
P1045	LWR Severe Core Damage Phenomenology Program Plan - Volume I: Melt-Progression Phenomenology and Damaged Fuel Relocation Programs	NUREG/CR-2725 and SAND82-1115	November 1982
P1046	Summary Report: Special Committee on Source Terms	NA	September 1984
P1047	NPR/FCI EXO-FITS Experiments Series Report	SAND91-1544	January 1993

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P1048	MELCOR 1.8.0: A Computer Code for Nuclear Reactor Severe Accident Source Term and Risk Assessment Analysis	SAND90-0364	January 1991
P1049	MELCOR 1.8.1 Assessment: ACRR Source Term Experiments ST-1/ST-2	SAND91-2833	April 1992
P1050	Project Plan: Fabrication of ACRR Fuel Rods	TD1699	January 14, 1983
P1051	The Global Nuclear Future, The Next Era of Nuclear Power		Spring 2002
P1100	Programmatic Waste Acceptance Criteria	POL-95-01	October 7, 1997
P1101	Waste Handling	FOP 00-02	June 26, 2006
P1102	Building 6580 Hot Cell Facility, Steel Containment Boxes and Zone 2A Process Knowledge Documentation: Isotope Production Program, Hot Cell Facility Decontamination Project	NA	June 26, 1996
P1104	Hot Cell Facility (HCF) Safety Analysis Report, Main Report and Appendices	SAND94-2650	10/21/1994
U1001	Star 1 Quick Look Report	U001	November 29, 1983
U1002	Star -7 Data Report	U002	July 1987
U1004	Plan for ACRR Source Term Experiments	U004	NA
U1009	DFR TLM Demonstration Test	NA	September 4, 1983
U1010	Radionuclide Release from Severely Damaged Light Water Reactor Fuel, Annular Core Research Reactor Inpile Test Program Plan	SAND84-1582	July 1984
U1011	Reassessment of the Technical Bases for Estimating Source Terms (Draft Report for Comment)	NUREG-0956	July 1985
U1012	ST-2 Experiment Plan, Corrections, and Appendix of Instrumentation, also includes QAP and SOP	NA	October 19, 1987
U1014	The USNRC Severe Fuel Damage Research Program	NA	NA
U1015	Task Quality Plan for the Transient Fuel and Target Performance Cask	TWP No. 2840.131	04/30/1991
U1021	Collection of Modifications/Expenditures of Nuclear Materials Forms Pertaining to C0, C3, C6, NPR/ACRR, and SRS/NPR and Nuclear Radioactive Material Transfer Forms	NA	07/09/1991 thru 06/10/1992, not inclusive
U1022	Procedure for STAR Experiments; STAR Handling Procedures	NA	not dated; 1984

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U1025	Instructions: NPRP Instruction for SRS Fuel Element Cutting; SRS-NPR Irradiated Fuel Sampling Cutting Instructions; SRS-NPR Unirradiated Fuel Sampling Cutting Instructions	NA	1990; 07/03/1991; 1991
U1026	Procedure for fabricating uranium oxide fission foils by electrodeposition	NA	1986
U1027	Procedures: Glovebox Clean-up Procedure; Bldg 6580/rm 203 procedure for coating Aluminium Oxided Tubes with Uranium	NA	not dated
U1028	Procedure for DF experiment	NA	Not Dated